

CLAIM LISTING FOR USSN 10/656,529

Claims 1-21 (cancelled)

- 1        22. (Previously presented) A method for operating a fuel cell system, the system  
2        including a stack of PEM fuel cells including at least one cooler for carrying  
3        antifreeze through the stack to remove heat, the fuel cell system further  
4        including a water circulation system for accumulating water and circulating  
5        that water through water flow passages passing through each cell, wherein, at  
6        the time of start-up, the stack has frozen water therein and there is insufficient  
7        liquid water within the water circulation system to enable the circulation of  
8        water, the method for operating the fuel cell system including (a) starting up  
9        and operating the frozen stack by introducing non-humidified reactants into  
10       the cells and connecting a load across the stack to generate heat to increase the  
11       stack temperature to above 0°C and thereby melt frozen water within the stack,  
12       including accumulating liquid water during stack operation until there is  
13       sufficient liquid water to enable circulation of liquid water through the cell  
14       water flow passages, and thereafter circulating that water through the water  
15       flow passages to provide humidification for the cells, and, (b) at a stack  
16       operating temperature above 0° C, initiating and maintaining the circulation of  
17       antifreeze through the stack cooler to prevent the operating temperature of the  
18       stack from increasing beyond a preselected temperature during the period of  
19       operation of the stack prior to said step of circulating the water, said  
20       preselected temperature being selected to prevent the cells from drying out  
21       during said period of operation, and (c) allowing the stack operating  
22       temperature to increase above that preselected temperature after water  
23       circulation through the water flow passages has begun, and (d) shutting down  
24       the stack and, upon shutdown, draining liquid water from the cell water flow  
25       passages before it freezes.
- 1       23. (Previously presented) The method according to claim 22, wherein the stack  
2       operating temperature is allowed to increase to said preselected temperature  
3       before antifreeze circulation is initiated, and the antifreeze circulation

4 maintains the stack operating temperature at said preselected temperature until  
5 water circulation through the water flow passages has begun.

1 24. (Previously presented) The method according to claim 22, wherein the  
2 preselected temperature is no more than about 40°C.

1 25. (Previously presented) The method according to claim 22, wherein the  
2 preselected temperature is between 30°C and 40°C.

1 26. (Previously presented) The method according to claim 23, wherein said  
2 preselected temperature is between 30°C and 40°C.

1 27. (Previously presented) The method according to claim 22, wherein the water  
2 circulation system includes a water accumulator, wherein upon start-up of the  
3 stack the accumulator has frozen water therein, and operation of the stack after  
4 startup is used to melt frozen water within the accumulator.

Claims 28-30 (canceled)